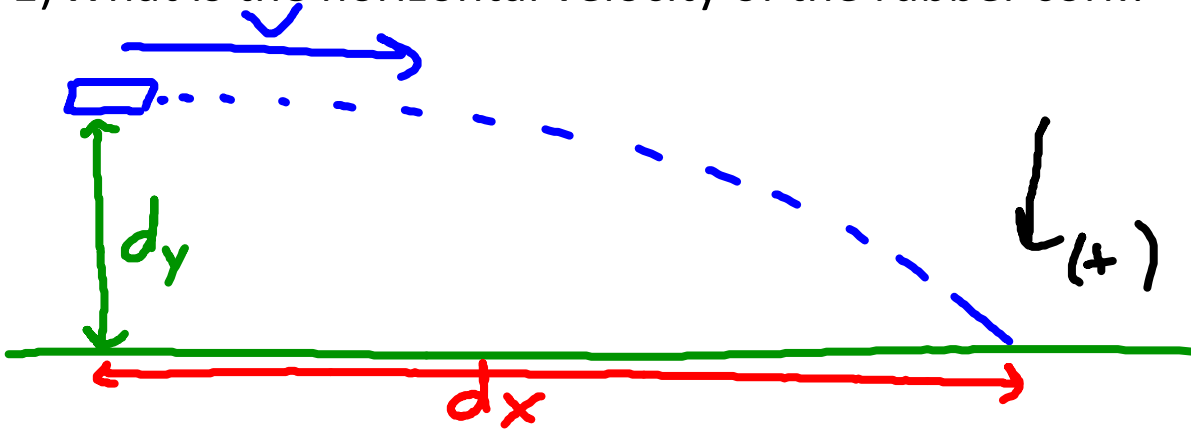


Exploding Bottle Demo

1) What is the horizontal velocity of the rubber cork?



horiz	vert
$dx = 4.2 \text{ m}$	$dy = 1.228 \text{ m}$
$v_x = \frac{dx}{t}$	$a = 9.8 \text{ m/s}^2$
	$v_{iy} = 0 \text{ m/s}$
	$t = ? = .501 \text{ s}$

$$\frac{dy}{\frac{1}{2}a} = \frac{v_{iy}t + \frac{1}{2}at^2}{\frac{1}{2}a}$$

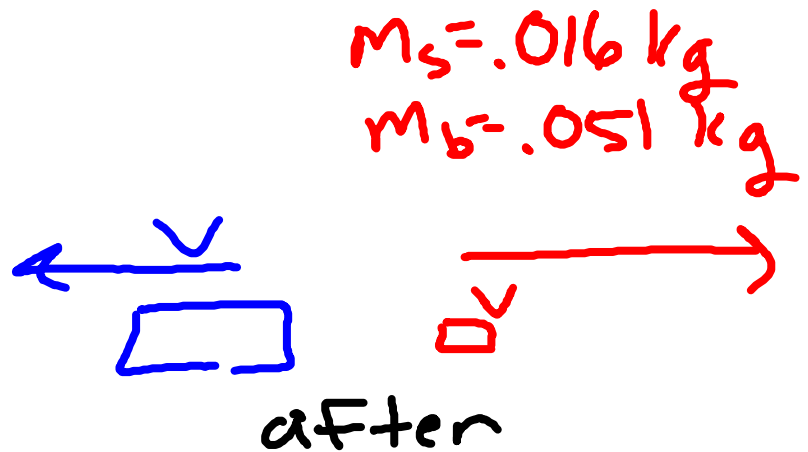
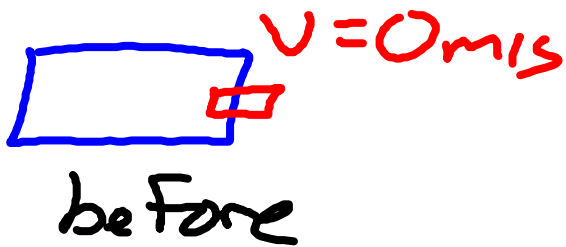
$$\sqrt{\frac{dy}{\frac{1}{2}a}} = \sqrt{t^2} = \sqrt{\frac{(1.228 \text{ m})}{\frac{1}{2}(9.8 \text{ m/s}^2)}}$$

$$\underline{t = 0.501 \text{ s}}$$

$$v_x = \frac{(4.20 \text{ m})}{(.501 \text{ s})}$$

$$\boxed{v_x = 8.38 \text{ m/s}}$$

2) What is the horizontal velocity of the bottle?



$$P_b = P_a$$

$$0 = P_s - P_b$$

$$P_s = P_b$$

$$\frac{m_s v_s}{m_b} = \frac{m_b v_b}{m_b}$$

$$v_b = \frac{(.016 \text{ kg})(8.38 \text{ m/s})}{(.051 \text{ kg})}$$

$$v_b = 2.63 \text{ m/s}$$